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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
BROWN, TIMOTHY M	

ART UNIT	PAPER NUMBER
1648	

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/622,124	BACHMANN ET AL.	
	Examiner	Art Unit	
	Timothy M. Brown	1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) *5,9,10,12,30,41,49,50,54 and 56-60* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-8,11,13-29,31-40,42-48,51-53,55,61 and 62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/15/04; 2/27/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Non-Final Office Action is responsive to the claims filed July 18, 2004 and the telephonic interview with Applicants' representative on November 28, 2005. Claims 1-62 are pending. During the interview, Applicants' representative elected to prosecute Group I, species xiii (Q beta phage) and the species comprising SEQ ID NO:31 based on the restriction requirement appearing below.

Claims 1-4, 6-8, 11, 13-29, 31-40, 42-48, 51-53, 55, 61 and 62 are under examination. Claims 5, 9, 10, 12, 30, 41, 49, 50, 54 and 56-60 are withdrawn.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-55, 61 and 62, drawn to a composition and a method of making the composition, wherein the composition comprises a core particle and a ghrelin peptide antigen, classified in class 435, subclass 235.1.

II. Claims 56-60, drawn to a method of immunization, classified in class 424, subclass 198.1.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case, Invention I comprises a core particle and a ghrelin peptide

antigen, both of which can be used to capture antibody. Invention I can therefore be used in a materially different process.

Election of Species

An election of Group I requires a further election of one of the following sources of recombinant protein:

i. Hepatitis B virus
ii. Measles virus
iii. Sinbis virus
iv. Rotavirus
v. Foot and mouth disease virus
vi. Retrovirus
vii. Norwalk virus
viii. Alphavirus
ix. Human papilloma virus
x. Polyoma virus
xi. Bacteriophages
xii. Ty
xiii. Q beta phage
xiv. GA phage
xv. fr phage
xvi. AP205 phage
xvii. R17 phage

xviii. SP phage

xix. MS2 phage

xx. M11 phage

xxi. MX1 phage

xxii. NL95 phage

xxiii. f2 phage

xxiv. PP7 phage

Species i-xxiv are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions comprise specific, distinct compositions that have not been disclosed as useable together. Moreover, species i-xxiv are drawn to a wide variety of pathogenic species with distinct antigenicities. Thus, species i-xxiv have different effects and different modes of operation. For at least these reasons, Species i-xxiv are unrelated.

An election of an RNA phage requires a further election of one of the polypeptide sequences listed in claim 12. These polypeptide sequences are not disclosed as useable together because there is no teaching of the specific combination of sequences claimed. Also, claim 12's polypeptide sequences have distinct chemical compositions with confer unique reactivities. The sequences listed under claim 12 are therefore unrelated due to different effects.

An election of Invention I requires a further election of one of the species of ghrelin peptide sequences listed in claims 25 and 30. As with the sequences listed above, the sequences of claims 25 and 30 have not been disclosed as useable together. These peptide sequences also

have unique biological activities due to their distinct chemical compositions. Thus, the sequences of claims 25 and 30 are unrelated.

Prosecution will be restricted to the elected species if no generic claim is finally held allowable.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims that depend from or otherwise include all the limitations of the allowable product claim will be rejoined in accordance with the provisions of MPEP § 821.04. **Process claims that depend**

from or otherwise include all the limitations of the patentable product will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier. Amendments submitted after final rejection are governed by 37 CFR 1.116; amendments submitted after allowance are governed by 37 CFR 1.312.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103, and 112. Until an elected product claim is found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowed product claim will not be rejoined. See "Guidance on Treatment of Product and Process Claims in light of *In re Ochiai, In re Brouwer* and 35 U.S.C. § 103(b)," 1184 O.G. 86 (March 26, 1996). Additionally, in order to retain the right to rejoinder in accordance with the above policy, Applicant is advised that the process claims should be amended during prosecution either to maintain dependency on the product claims or to otherwise include the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-3, 19, 20, 22-29 and 31 are rejected under 35 U.S.C. 101 for reading on a product of nature. These claims are drawn to a composition comprising a core particle having a first attachment site, and a ghrelin polyprotein having a naturally occurring second attachment. Ghrelin is naturally produced in the human body. Thus, a human infected with a virus (i.e. core particle) would comprise the claimed composition. The claims also provide that the core particle may be Q beta phage. Q beta phage naturally infects human enteric bacteria. Based on their scope, claims 1-3, 19, 20, 22-29 and 31 are rejected for reading on a product of nature.

35 U.S.C 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4, 6-8, 11, 13-29, 31-40, 42-48, 51-53, 55, 61 and 62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite in the recitation of "naturally occurring." This language is indefinite because one skilled in the art would not be able to determine whether the claimed attachment site is naturally occurring. This results because ghrelin mutations could exist in nature that would not be known to the skilled artisan.

Claim 13 is indefinite in the recitation of "mutant coat proteins." This language is indefinite because it is unclear how the phage genome is affected by Applicants' use of

"mutant." A mutant coat protein may be a naturally occurring variant, or a recombinantly produced protein. In other words, the use of "mutant" fails to particularly point out and distinctly claim the composition of the coat protein.

Claims 28 and 29 are indefinite for lacking antecedent basis for "said amino acid linker." The claims depend from claim 1 or claim 27, yet claim 1 fails to provide antecedent basis for "said amino acid linker."

35 U.S.C 112, first paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4, 6-8, 11, 13-29, 31-40, 42-48, 51-53, 55, 61 and 62 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants claim any second attachment site on an antigenic ghrelin peptide that is naturally occurring, or non-naturally occurring. However, the specification fails to provide written support for the breadth of the claimed second attachment site. Moreover, the molecular interactions between an unspecified "core particle" and a ghrelin peptide would be complex such that the skilled artisan would not be able to determine those core particles that would interact with the claimed attachment site.

Claims 1-4, 6-8, 11, 13-29, 32-34, 55, 61 and 62 are therefore rejected for failing to comply with the written description requirement.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 19, 20, 22-29 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Woody et al. (Woody, M.A. "Replication of coliophage Q beta as affected by host cell number, nutrition, competition from insusceptible cells and non-FRNA coliphages" J. Appl. Microb. (April 1997) 82, (4): 431-440) (abstract only)).

As noted above, claims 1-3, 19, 20, 22-29 and 31 are drawn to a composition comprising ghrelin and a core particle. The composition may, or may not, comprise a recombinant virus-like particle. As noted above, such a composition at least reads on a human since ghrelin is an endogenous human protein and Q beta phage populates human intestines. Woody et al. disclose that Q beta phage is an enteric bacteriophage that can be found in humans. Based on this disclosure, Woody et al. anticipate the subject matter of claims 1-3, 19, 20, 22-29 and 31.

Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 6-8, 11, 13, 14, 21, 32-40, 42, 43, 48, 51-53, 55, 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Nakazato et al.*** (Nakazato, M. "A role for ghrelin in the central regulation of feeding" Nature (January 2001) 409: 194-198) in view of ***Vasiljeva et al.*** (Vasiljeva, I. "Mosaic Q beta coats as a new presentation model" FEBS (1998) 431: 7-11).

Applicants claim a vaccine composition comprising a Q beta bacteriophage having a first attachment site, and an antigenic ghrelin peptide comprising a second attachment site, wherein the second attachment site is capable of association with the first attachment side to form an ordered and repetitive antigen array.

Nakazato et al. disclose using an antigenic ghrelin peptide to vaccinate a rabbit for the production of polyconal anti-ghrelin antibodies (see "Immunoneutralization" p. 197). Nakazato et al. do not expressly teach administering ghrelin in conjunction with Q beta phage to form an ordered and repetitive antigen array. However, Vasiljeva et al. disclose using Q beta phage capsid as a carrier for the administration of antigenic peptides. Vasiljeva et al. teach that using Q beta phage as an antigenic peptide carrier is advantageous because Q beta phage particles (i) can self-assemble without viral RNA, (ii) is non-infectious, and (iii) can present between 25 and 86 copies of antigen per capsid shell. Thus, one skilled in the art would be motivated to present Nakazato et al.'s ghrelin antigen on a Q beta phage carrier to achieve these advantages.

Moreover, such a combination would enjoy a reasonable expectation of success since a chimeric Q beta phage capsid assembly can easily be produced through recombinant DNA technology. It therefore would have been obvious to combine Nakazato et al. and Vasiljeva et al. to arrive at the claimed invention.

Note that although the references do not teach the use of an adjuvant, the skill generally available at the time this application was filed taught that an immune response can be enhanced through the use of an adjuvant such as alum or Freund's complete adjuvant. Therefore, it would have been obvious to modify the claimed vaccine composition to include an adjuvant.

Claims 15-18 and 44-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Nakazato et al.*** in view of ***Vasiljeva et al.*** as discussed above, and further in view of ***Lechner et al.*** (Lechner, F. "Virus-Like Particles as a Modular System for Novel Vaccines" Intervirology (2002) 45: 212-217).

Nakazato et al. and Vasiljeva et al. teach all the features noted above. Nakazato et al. and Vasiljeva et al. do not expressly teach the addition or removal of lysines. However, Lechner et al. teach optimizing antigen presentation on a virus-like particle by modifying lysine residues (see p. 213). Lechner et al. further teach modifying lysine residues has the effect of presenting heterologous antigens in a spacially ordered array. Thus, at the time of Applicants' invention, it would have been obvious to modify Nakazato et al. and Vasiljeva et al. to include Lechner et al.'s lysine modifications. One skilled in the art would have a reasonable expectation of success with this combination since like Vasiljeva et al. involves presenting antigens on a RNA bacteriophage and Lechner et al. only involves improving the attachment of heterologous

antigens to a bacteriophage carrier. It therefore would have been obvious to combine Nakazato et al., Vasiljeva et al. and Lechner et al. to arrive at the claimed invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy M. Brown whose telephone number is (571) 272-0773. The examiner can normally be reached on Monday - Friday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Housel can be reached on (571) 272-0902. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy M. Brown
Examiner
Art Unit 1648

tmb

James C. Housel 1/9/06
JAMES HOUSEL
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

TMB 1/9/06